CONTENTS

Volume 13, Issue Nos 1–18

HYDROLOGICAL PROCESSES

VOLUME 13, ISSUE No. 1 *January 1999*

The Particle Size Characteristics of Fine-grained Channel Deposits in the River Exe Basin, Devon, U.K.: J. M. Phillips and D. E. Walling 1

Capabilities and Limitations of Detailed Hillslope Hydrological Modelling: A. Bronstert 21

Routing of Canopy Drip in the Snowpack below a Spruce Crown: M. Bründl, M. Schneebeli and H. Flühler 49

Land Use Effects on Soil Crusting and Hydraulic Response of Surface Crusts on a Tropical Alfisol: R. M. Bajracharya and R. Lal 59

Generalized Flux Law, with an Application: V. P. Singh and M. Prasana 73

Evaluation of an Interrill Soil Erosion Model Using Laboratory Catchment Data: A. W. Jayawardena and R. R. Bhuiyan 89

The Use of Large Bottomless Lysimeters in the Determination of Water Balances for a Raised Mire: J. C. Kelemen and H. A. P. Ingram 101

Stable Isotopes in Precipitation in the Volcanic Island of Cheju, Korea: S. Lee, J. Shimada and I. Kayane 113

VOLUME 13, ISSUE No. 2 *15 February 1999*

A Self-organization Algorithm for Real-time Flood Forecast: F-J. Chang and Y-Y. Hwang 123

Tracer and Hydrometric Study of Preferential Flow in Large Undisturbed Soil Cores from the Georgia Piedmont, USA: J. McIntosh, J. J. McDonnell and N. E. Peters . . . 139

Radiative Characteristics in a Japanese Forested Drainage Basin During Snowmelt: H. Nakabayashi, N. Ishikawa and Y. Kodama 157

Attributes and Uncertainty of Dissolved Zinc Data from a Mined Catchment: B. S. Caruso 169

Automated Calibration Applied to Watershed-scale Flow Simulations: Z. Yu and F. W. Schwartz 191

Characterising Solute Transport in Undisturbed Soil Cores Using Electrical and X-Ray Tomographic Methods: P. A. Olsen, A. Binley, S. Henry-Poulter and W. Tych . . 211

Speciation of Organic Carbon, Cu and Mn in the River Marne (France): The Role of Colloids: A. Jaïry, B. Garban, M. Blanchard and A. Chesterikoff 223

Fractal Dimensions of Suspended Solids in Streams: Comparison of Sampling and Analysis Techniques: D. H. De Boer and M. Stone 239

VOLUME 13, ISSUE No. 3 *February 1999*

Groundwater Dominated Rivers: D. A. Sear, P. D. Armitage and F. H. Dawson . . 255

Influence of Ground Water on Surface Water Conditions in a Glacial Flood Plain of the Swiss Alps: J. V. Ward, F. Malard, K. Tockner and U. Uehlinger 277

Water Flow and Nitrate Transport to a Groundwater-fed Stream in the Belgian-Dutch Chalk Region: H. J. van Lanen and R. Dijksma 295

Water Temperatures and Heat Budgets in Dorset Chalk Water Courses: B. W. Webb and Y. Zhang 309

Source, Storage and Mobilisation of Fine Sediment in a Chalk Stream System: D. E. Walling and C. M. Amos 323

Recovery of Headwater Stream Flora Following the 1989–1992 Groundwater Drought: N. H. Holmes 341

The Influence of Catchment Geology on the Longitudinal Distribution of Macroinvertebrate Assemblages in a Groundwater Dominated River: C. E. Cannan and P. D. Armitage 355

A Nine-Year Study of the Macroinvertebrate Fauna of A Chalk Stream: J. F. Wright and K. L. Symes 371

The Influence of Drought on Chalk Stream Macroinvertebrates: P. J. Wood and G. E. Petts 387

Groundwater and Fish—Insights from Northern North America: G. Power, R. S. Brown and J. G. Imhof 401

Microthermal Gradients and Ecological Implications in Dorset Rivers: E. Clark, B. W. Webb and M. Ladle 423

Water Temperatures Within Spawning Beds in Two Chalk Streams and Implications for Salmonid Egg Development: R. M. Acornley 439

Sediment Transport and Siltation of Brown Trout (*Salmo trutta* L.) Spawning Gravels in Chalk Streams: R. M. Acornley and D. A. Sear 447

A Habitat Assessment Approach to the Management of Groundwater Dominated Rivers: C. N. Elliott, M. J. Dunbar, I. Gowing and M. C. Acreman 459

The Influence of Three Methods of Gravel Cleaning on Brown Trout, *Salmo trutta*, Egg Survival: V. J. Shackle, S. Hughes and V. T. Lewis 477

Impacts of Groundwater Abstraction on the Trout Fishery of the River Piddle, Dorset, and an Approach to their Alleviation: A. P. Strevens 487

Flow Management to Sustain Groundwater-Dominated Stream Ecosystems: G. E. Petts, M. A. Bickerton, C. Crawford, D. N. Lerner and D. Evans 497

VOLUME 13, ISSUE No. 4 *March 1999*

Energy Balance Above a Boreal Coniferous Forest: A Difference in Turbulent Fluxes Between Snow-Covered and Snow-Free Canopies: Y. Nakai, T. Sakamoto, T. Terajima, K. Kitamura and T. Shirai 515

The Effects of Eight Years Aeration and Isolation from Polluting Discharges on Sewage- and Metal-Contaminated Sediments: S. Boult and J. Rebbeck 531

On the Stormflow Response of Upland Alpine Catchments: S. Orlandini, A. Perotti, G. Sfondrini and A. Bianchi 549

Component Flow Processes at Four Streams in The Catskill Mountains, New York, Analysed Using Episodic Concentration/Discharge Relationships: C. Evans, T. D. Davies and P. S. Murdoch 563

Regional Potential Evapotranspiration in Arid Climates Based on Temperature, Topography, and Calculated Solar Radiation: L. Shevenell 577

The Role of Urban Surfaces (Permeable Pavements) in Regulating Drainage and Evaporation: Development of A Laboratory Simulation Experiment: C. T. Andersen, I. L. Foster and C. J. Pratt 597

Scaling Input Data by GIS for Hydrological Modelling: A. H. Thieken, A. Lücke, B. Diekkrüger and O. Richter 611

VOLUME 13, ISSUE No. 5 *15 April 1999*

Introduction: Process Interactions in the Environment: T. R. Green and M. Sivapalan . 632

The Tarrawarra Project: High Resolution Spatial Measurement, Modelling and Analysis of Soil Moisture and Hydrological Response: A. W. Western, R. B. Grayson and T. R. Green 633

Development of a Simplified Unsaturated Module for Providing Recharge Estimates to Saturated Groundwater Models: C. R. Beverly, R. J. Nathan, K. J. Malafant and D. P. Fordham 653

The Sensitivity of a Catchment Model to Soil Hydraulic Properties Obtained by using Different Measurement Techniques: S. H. Davis, R. A. Vertessy and R. P. Silberstein 677

Large-scale Modelling of Forest Hydrological Processes and their Long Term Effect on Water Yield: F. R. Watson, R. A. Vertessy and R. B. Grayson 689

A Comparison of Algorithms for Stream Flow Recession and Baseflow Separation: T. Chapman 701

Baseflow Recession and Recharge as Nonlinear Storage Processes: H. Wittenberg . . 715

A Conceptual Model of Sediment Transport: Application to the Avon River Basin in Western Australia: N. R. Viney and M. Sivapalan 727

Modelling Upland and Instream Erosion, Sediment and Phosphorus Transport in a Large Catchment: A. J. Jakeman, T. R. Green, S. G. Beavis, L. Zhang, C. R. Dietrich and P. F. Crapper 745

Erosional History of the Warrah Catchment in the Liverpool Plains, New South Wales: S. G. Beavis, L. Zhang, A. J. Jakeman and S. D. Gray 753

An Analytical Model for Stream Sediment Transport: Application to Murray and Murrumbidgee River Reaches, Australia: C. R. Dietrich, T. R. Green and A. J. Jakeman 763

Relating Stream-Bank Erosion to In-Stream Transport of Suspended Sediment: T. R. Green, S. G. Beavis, C. R. Dietrich and A. J. Jakeman 777

Heavy Metal Distribution Model Under Estuarine Mixing: F. Mwanuzi and F. De Smedt 789

VOLUME 13, ISSUE No. 6 *30 April 1999*

A GIS-Based Variable Source Area Hydrology Model: J. R. Frankenberger, E. S. Brooks, M. Todd Walter, M. F. Walter and T. S. Steenhuis 805

Modelling Long-Term Contaminant Migration in A Catchment at Fine Spatial and Temporal Scales Using the UP System: W. T. Sloan and J. Ewen 823

Evaluation of CADISSE, A Regional Storage Capacity Model: B. van der Wateren-de Hoog 847

Stream Temperature, Specific Conductance and Runoff Processes in Mountain Watersheds: D. Kobayashi, Y. Ishii and Y. Kodama 865

Hydrological Flow Paths Controlling Stream Chemistry in Japanese Forested Watersheds: K. Ohrui and M. J. Mitchell 877

Spectral Responses of Water Level in Tidal River and Groundwater: D. Ching-Fang Shih, K.-F. Chiou, C.-D. Lee and I.-S. Wang 889

Numerical Simulation of Three-dimensional Flow Hydraulics in a Braided Channel: A. P. Nicholas and G. H. Sambrook Smith 913

VOLUME 13, ISSUE No. 7 *May 1999*

River Basin Sediment Dynamics and Interactions within the UK Land-Ocean Interaction Study: The Context: G. J. L. Leeks and D. E. Walling 931

Suspended Sediment Fluxes in the Humber Catchment, UK: P. D. Wass and G. J. L. Leeks 935

Fingerprinting Suspended Sediment Sources in the Catchment of the River Ouse, Yorkshire, UK: D. E. Walling, P. N. Owens and G. J. L. Leeks 955

Downstream Change in River Bank Erosion Rates in the Swale-Ouse System, Northern England: D. M. Lawler, J. R. Grove, J. S. Couperthwaite and G. J. L. Leeks . . . 977

Rates of Contemporary Overbank Sedimentation and Sediment Storage on the Floodplains of the Main Channel Systems of the Yorkshire Ouse and River Tweed, UK: D. E. Walling, P. N. Owens and G. J. L. Leeks 993

Development of A Sediment Delivery Model for Application in Large River Basins: P. S. Naden and D. M. Cooper 1011

Estimating the Suspended Sediment Loads of Rivers in the LOIS Study Area Using Infrequent Samples: J. M. Phillips, B. W. Webb, D. E. Walling and G. J. L. Leeks . 1035

The Influence of Recent Environmental Change on Flooding and Sediment Fluxes in the Yorkshire Ouse Basin: S. A. Longfield and M. G. Macklin 1051

Changes in the Physical and Geochemical Properties of Suspended Sediment Delivered to the Headwaters of LOIS River Basins Over the Last 100 Years: A Preliminary Analysis of Lake and Reservoir Bottom Sediments: I. L. Foster and J. A. Lees 1067

2000 Years of Sediment-borne Heavy Metal Storage in the Yorkshire Ouse Basin, NE England, UK: K. A. Hudson-Edwards, M. G. Macklin and M. P. Taylor 1087

Interactions of Phosphorus with Sediments in the River Swale, Yorkshire, UK: W. A. House and M. S. Warwick 1103

Acid-available Particulate Trace Metals Associated with Suspended Sediment in the Humber Rivers: A Regional Assessment: C. Neal, H. P. Jarvie and T. Oguchi . . 1117

Changing Headwater Suspended Sediment Yields in the LOIS Catchments Over the Last Century: A Palaeolimnological Approach: I. L. Foster and J. A. Lees 1137

Dynamics of Erosion and Deposition Events on an Intertidal Mud Bank at Burringham, River Trent, UK: S. B. Mitchell, J. S. Couperthwaite, J. R. West and D. M. Lawler . 1155

Suspended Sediment Fluxes in the Tidal Ouse, UK: R. J. Uncles and J. A. Stephens . 1167

VOLUME 13, ISSUE No. 8 *15 June 1999*

Prediction of Episodic Acidification in North-eastern USA: An Empirical/Mechanistic Approach: T. D. Davies, M. Tranter, P. J. Wigington Jr, K. N. Eshleman, N. E. Peters, J. Van Sickle, D. R. DeWalle and P. S. Murdoch 1181

Occurrence, Shape and Movement of Daily Rainfall in the Huai Basin, China: C. Svensson 1196

The Effects of Particle Breakage and Abrasion – from Simulated Fluvial Transport, on Phosphorus Sorption by Two Soils: R. H. Crockford and I. R. Willett 1215

Changes in the Discharge Pattern of a Cutover Raised Bog During Rewetting: J. M. Spieksma 1231

A Semi-Distributed Parallel-Type Linear Reservoir Rainfall-Runoff Model and its Application in Taiwan: L. Hsieh and R. Wang 1245

A Simple Algorithm for Generating Streamflow Networks for Grid-Based, Macroscale Hydrological Models: G. O'Donnell, B. Nijssen and D. P. Lettenmaier 1267

Effect of Climate Changes on Sea Water Intrusion in Coastal Aquifers: M. M. Sherif and V. P. Singh 1274

The Relationship Between Dissolved Organic Carbon in Stream Water and Soil Organic Carbon Pools at Different Spatial Scales: J. A. Aitkenhead, D. Hope and M. F. Billett 1285

VOLUME 13, ISSUE No. 9 *30 June 1999*

Channel Precipitation Dynamics in a Forested Pennsylvania Headwater Catchment (USA): T. W. Crayosky, D. R. DeWalle, T. A. Seybert and T. E. Johnson 1303

Improved Parameter Estimation for Hydrological Models using Weighted Object Functions: A. Stein and W. J. Zaadnoordijk 1315

Variations in Trace Element Geochemistry in the Seine River Basin Based on Floodplain Deposits and Bed Sediments: A. J. Horowitz, M. Meybeck, Z. Idlafkih and E. Biger . 1329

Fine-Scale Characteristics of Groundwater Flow in a Peatland: J. Z. Drexler, B. L. Bedford, R. Scognamiglio and D. I. Siegel 1341

Magnitude-Frequency Characteristics of Effective Discharge for Suspended Sediment Transport, Fraser River, British Columbia, Canada: H. Sichingabula 1361

Pathlines of Pollutant Migration in Groundwater of the Visakhapatnam Urban Area, India: N. Subba Rao and V. S. Gurunadha Rao 1381

A Geomorphologic Kinematic-Wave (GKW) Model for Estimation of Floods from Small Alpine Watersheds: D. D. Berod, V. P. Singh and A. Musy 1391

Soil Hydraulic Conductivities of Latosols Under Pasture, Forest and Teak in Rondonia, Brazil: H. Elsenbeer, B. E. Newton, T. Dunne and J. M. de Moraes 1417

VOLUME 13, ISSUE No. 10 *July 1999*

Distribution of Throughfall and Stemflow in Multi-strata Agroforestry, Perennial Monoculture, Fallow and Primary Forest in Central Amazonia, Brazil: G. Schroth, L. Ferreira da Silva, M. Wolf, W. Teixeira and W. Zech 1423

Suspended Sediment Dynamics in a Large Drainage Basin: The River Rhine: N. M. Asselman 1437

Denitrification in Riparian Buffer Zones: The Role of Floodplain Hydrology: T. P. Burt, L. S. Matchett, K. T. Goulding, C. P. Webster and N. E. Haycock 1451

Solute Concentrations of Overland Flow Water in a Cultivated Field: Spatial Variations, Intra- and Inter-storm Trends: P. Durand, S. Cros-Cayot, C. Gascuel-Odoux and D. Heddadj 1465

A Study of the Groundwater Cycle in Sri Lanka using Stable Isotopes: X. Song, I. Kayane, T. Tanaka and J. Shimada 1479

Relationships between Hydraulic Parameters in a Small Stream Under Varying Flow and Seasonal Conditions: D. R. Hart, P. J. Mulholland, E. R. Marzolf, D. L. DeAngelis and S. P. Hendricks 1497

Spatial and Temporal Variations of Nutrient Concentration in the Groundwater of a Floodplain: Effect of Hydrology, Vegetation and Substrate: N. Takatert, J. Sánchez Pérez and M. Trémolières 1511

Comparison of Simple Runoff Models Used in Korea for Small Watersheds: J. Park, I. Kang and V. P. Singh 1527

VOLUME 13, ISSUE No. 11 *15 August 1999*

The Effects of Antecedent Moisture Conditions on the Relationship of Hydrology to Hydrochemistry in a Small Forested Watershed: P. M. Biron, A. G. Roy, F. Courchesne, W. H. Hendershot, B. Côté and J. Fyles 1541

Water Transit Times and Flow Paths from Two Line Injections of 3H and 36Cl in a Microcatchment at Gårdsjön, Sweden: L. Nyberg, A. Rodhe and K. Bishop . . . 1557

Flow Behaviour, Suspended Sediment Transport and Transmission Losses in a Small (Sub-bank-full) Flow Event in an Australian Desert Stream: D. Dunkerley and K. Brown . 1577

Observation and Estimation of Daily Actual Evapotranspiration and Evaporation on a Glacierized Watershed at the Headwater of the Urumqi River, Tianshan, China: Z. Wanchang, Z. Yinsheng, K. Ogawa and Y. Yamaguchi 1589

Multi-criterial Validation of TOPMODEL in a Mountainous Catchment: A. Güntner, S. Uhlenbrook, J. Seibert and Ch. Leibundgut 1603

Land Use Change Effects on Runoff and Erosion from Plot to Catchment Scale on the Basaltic Plateau of Southern Brazil: N. M. Dos Reis Castro, A-V. Auzet, P. Chevallier and J-C. Leprun 1621

Theoretical Assessment of Changes in Design Flood Peak on an Overland Plane for Two Opposing Urbanization Sequences: T. S. W. Wong and Y. Li 1629

Assessment of Transmission Losses and Groundwater Recharge from Runoff Events in a Wadi under Shortage of Data on Lateral Inflow, Negev (Israel): I. Shentsis, L. Meirovich, A. Ben-Zvi and E. Rosenthal 1649

Differential Water Distribution over Dune Slopes as Affected by Slope Position and Microbiotic Crust, Negev Desert, Israel: G. J. Kidron 1665

Analysis of Precipitation Appearance in Time: O. Bonacci and D. Matešan 1683

Calibration and Validation of a General Infiltration Model: S. K. Mishra, S. R. Kumar and V. P. Singh 1691

VOLUME 13, ISSUE No. 12 *September 1999*

Preface
International Conference on Snow Hydrology: The Integration of Physical, Chemical and Biological Systems: J. P. Hardy, M. R. Albert and P. Marsh 1719

Capillary Rise in Snow: C. Coléou, K. Xu, B. Lesaffre and J. B. Brzoska 1721

Air Permeability and Capillary Rise as Measures of the Pore Structure of Snow: An Experimental and Theoretical Study: R. E. Jordan, J. P. Hardy, F. E. Perron, Jr. and D. J. Fisk 1733

On Dielectric Properties of Dry and Wet Snow: A. D. Frolov and Y. Ya. Macheret . 1755

Incorporation of Spectral and Directional Radiative Transfer in a Snow Model: J. G. Glendinning and E. M. Morris 1761

Estimating the Amount of Snowmelt Based on Viscous Compression Model of Snow: Y. Kominami, Y. Endo and S. Niwano 1773

Sublimation from a Seasonal Snowpack at a Continental, Mid-latitude Alpine Site: E. Hood, M. Williams and D. Cline 1781

Importance of Ice Layers on Liquid Water Storage Within a Snowpack: P. Singh, G. Spitzbart, H. Huebl and H. W. Weinmeister 1799

Correlation Lengths of Meltwater Flow Through Ripe Snowpacks, Colorado Front Range, USA: M. W. Williams, R. Sommerfeld, S. Massman and R. Rikkers . . . 1807

Estimating Snowmelt Infiltration into Frozen Soils: L. Zhao and D. M. Gray . . . 1827

The Effect of Frozen Soil on Snowmelt Runoff at Sleepers River, Vermont: J. B. Shanley and A. Chalmers 1843

Representativeness of Arctic Weather Station Data for the Computation of Snowmelt in a Small Area: M-K. Woo, D. Yang and K. L. Young 1859

The Water Balance of a Sub-Arctic Town: A. F. Semádeni-Davis and L. Bengtsson . . 1871

An Elevation-dependent Snowmelt Model for Upland Britain: V. A. Bell and R. J. Moore 1887

The ABC's of Snowmelt: A Topographically Factorized Energy Component Snowmelt Model: K. S. Williams and D. G. Tarboton 1905

Sub-grid Parameterization of Snow Distribution for an Energy and Mass Balance Snow Cover Model: C. H. Luce, D. G. Tarboton and K. R. Cooley 1921

A Spatially Distributed Energy Balance Snowmelt Model for Application in Mountain Basins: D. Marks, J. Domingo, D. Susong, T. Link and D. Garen 1935

A Quasi Physical Snowmelt Runoff Modelling System for Small Catchments: N. K. Tuteja and C. Cunnane 1961

Representativeness of Local Snow Data for Large Scale Hydrologic Investigations: D. Yang and M-K. Woo 1977

Snowmelt and Runoff Modelling of an Arctic Hydrological Basin in West-Greenland: C. E. Boggild, C. J. Knudby, M. B. Knudsen and W. Starzer 1989

Methods for Developing Time-series Climate Surfaces to Drive Topographically Distributed Energy- and Water-Balance Models: D. Susong, D. Marks and D. Garen 2003

Distributed Mapping of Snow and Glaciers for Improved Runoff Modelling: J. Schaper, J. Martinec and K. Seidel 2023

Spectral Reflectance of Melting Snow in a High Arctic Watershed on Svalbard: Some Implications for Optical Satellite Remote Sensing Studies: J-G. Winther, S. Gerland, J. B. Ørbaek, B. Ivanov, A. Blanco and J. Boike 2033

Estimating the Mean Areal Snow Water Equivalent by Integration in Time and Space: T. Skaugen 2051

Use of Remote Sensing to Test and Update Simulated Snow Cover in Hydrological Models: O. Turpin, R. Ferguson and B. Johansson 2067

Ten Years of Monitoring Areal Snowpack in the Southern Alps using NOAA-AVHRR Imagery, Ground Measurements and Hydrological Data: R. Ranzi, G. Grossi and B. Bacchi 2079

Simulation of Snow Mass and Extent in General Circulation Models: Z-L. Yang, R. E. Dickinson, A. N. Hahmann, G-Y. Niu, M. Shaikh, X. Gao, R. C. Bales, S. Sorooshian and J. Jin 2097

VOLUME 13, ISSUE No. 14/15 *October 1999*

Preface
International Conference on Snow Hydrology: The Integration of Physical, Chemical and Biological Systems: J. P. Hardy, M. R. Albert and P. Marsh 2115

Snowcover Formation and Melt: Recent Advances and Future Prospects: P. Marsh . . 2117

The Ecology of Snow-covered Systems: A Brief Overview of Nutrient Cycling and Life in the Cold: H. G. Jones 2135

Scaling Issues in Snow Hydrology: G. Blöschl 2149

Snowpack Controls on Nitrogen Cycling and Export in Seasonally Snow-covered Catchments: P. D. Brooks and M. W. Williams 2177

Natural Variability in N Export From Headwater Catchments: Snow Cover Controls on Ecosystem N Retention: P. D. Brooks, D. H. Campbell, K. A. Tonnessen and K. Heuer 2191

Nitrogen Dynamics in Two High Elevation Catchments during Spring Snowmelt 1996, Rocky Mountains, Colorado: K. Heuer, P. D. Brooks and K. A. Tonnessen . . . 2203

Seasonal Change in Precipitation, Snowpack, Snowmelt, Soil Water and Streamwater Chemistry, Northern Michigan: R. Stottlemeyer and D. Toczydlowski 2215

Sensitivity Analysis Using Mass Flux and Concentration: T. Meixner, H. V. Gupta, L. A. Bastidas and R. C. Bales 2233

Modelling the Fate of Non-Polar Organic Chemicals During the Melting of an Arctic Snowpack: F. Wania, R. Semkin, J. T. Hoff and D. Mackay 2245

Transformations of Snow Chemistry in the Boreal Forest: Accumulation and Volatilization: J. W. Pomeroy, T. D. Davies, H. G. Jones, P. Marsh, N. E. Peters and M. Tranter 2257

Snow Depth, Soil Frost and Nutrient Loss in a Northern Hardwood Forest: P. M. Groffman, J. P. Hardy, S. Nolan, R. D. Fitzhugh, C. T. Driscoll and T. J. Fahey 2275

Effect of Subalpine Canopy Removal on Snowpack, Soil Solution, and Nutrient Export, Fraser Experimental Forest, CO: R. Stottlemyer and C. A. Troendle 2287

Comparison of the Effects of Rainfall and Snowmelt on the Carbon Discharge of a Small, Steep, Forested Watershed in Hokkaido, Northern Japan: T. Sakamoto, M. Takahashi, T. Terajima, Y. Nakai and Y. Matsuura 2301

Long-term Experimental Manipulation of Winter Snow Regime and Summer Temperature in Arctic and Alpine Tundra: M. D. Walker, D. A. Walker, J. M. Welker, A. M. Arft, T. Bardsley, P. D. Brooks, J. T. Fahnestock, M. H. Jones, M. Losleben, A. N. Parsons, T. R. Seastedt and P. L. Turner 2315

Physical and Optical Properties of Snow Covering Arctic Tundra on Svalbard: S. Gerland, J.-G. Winther, J. Børre Ørbaek, G. E. Liston, N. Are Øritsland, A. Blanco and B. Ivanov 2331

Snow Accumulation on Boards of Different Sizes and Shapes: R. Pfister and M. Schneebeli 2345

Measuring Branch Deflection of Spruce Branches caused by Intercepted Snow Load: M. Brundl, P. Bartelt, M. Schneebeli and H. Flühler 2357

The Effect of Canopy-Snow on the Energy Balance above a Coniferous Forest: Y. Nakai, T. Sakamoto, T. Terajima, K. Kitamura and T. Shirai 2371

Characteristics of the Heat Balance above the Canopies of Evergreen and Deciduous Forests during the Snowy Season: T. Ohta, K. Suzuki, Y. Kodama, J. Kubota, Y. Kominami and Y. Nakai 2383

Surface Energy Exchange over a Boreal Snowpack: Comparison of Two Snow Energy Balance Models: H. Koivusalo and M. Heikinheimo 2395

Seasonal Variation of Heat Balance Components over a Japanese Red Pine Forest in Snowy Northern Japan: K. Suzuki, T. Ohta, H. Miya and S. Yokota 2409

A Distributed Model of Blowing Snow Over Complex Terrain: R. Essery, L. Li and J. Pomeroy 2423

Distributed Simulation of Snowcover Mass- and Energy-Balance in the Boreal Forest: T. Link and D. Marks 2439

Relationships between Landscape, Snowcover Depletion, and Regional Weather and Climate: E. M. Greene, G. E. Liston and R. A. Pielke Sr. 2453

One-dimensional Snow Water and Energy Balance Model for Vegetated Surfaces: J. Jin, X. Gao, S. Sorooshian, Z.-L. Yang, R. Bales, R. E. Dickinson, S.-F. Sun and G.-X. Wu 2467

VOLUME 13, ISSUE No. 16 *November 1999*

Preface
P. Marsh iii

Hydrologic Assessment of an Inland Freshwater Delta using Multi-Temporal Satellite Remote Sensing: A. Pietroniro, T. Prowse and D. L. Peters 2483

Riverine Sediment Balance of the Mackenzie Delta, Northwest Territories, Canada: M. A. Carson, F. Conly and J. N. Jasper 2499

Lake Sedimentation in the Mackenzie Delta, NWT: P. Marsh, L. W. Lesack and A. Roberts 2519

Isotopic Characteristics of Ice Cover in a Large Northern River Basin: J. J. Gibson and T. D. Prowse 2537

Hydrology of Two Slopes in Subarctic Yukon, Canada: S. K. Carey and M. K. Woo . 2549

A Conceptual Framework for Runoff Generation in a Permafrost Environment: W. L. Quinton and P. Marsh 2563

The Effect of Sediment Concentration on Bedload Roughness: N. E. Bergeron and P. Carbonneau 2583

Importance of Shrinkage and Compression in Determining Water Storage Changes in Peat: The Case of a Mined Peatland: J. S. Price and S. M. Schlotzhauer 2591

A Methodology for Investigation of the Seasonal Evolution in Proglacial Hydrograph Form: D. M. Hannah, A. M. Gurnell and G. R. McGregor 2603

Flooding and the El Niño-Southern Oscillation Phenomenon along the Pacific Coast of Costa Rica: P. Waylen and M. Sadí Laporte 2623

VOLUME 13, ISSUE No. 17 *15 December 1999*

A Simple Triangular Approximation of the Area Function for the Calculation of Network Hydrological Response: C. Gandolfi, G. B. Bischetti and M. J. Whelan 2639

Using Multivariate Statistical Analysis of Groundwater Major Cation and Trace Element Concentrations to Evaluate Groundwater Flow in a Regional Aquifer: K. J. Stetzenbach, I. M. Farnham, V. F. Hodge and K. H. Johannesson 2655

Variations in Snowmelt Energy and Energy Balance Characteristics with Larch Forest Density on Mt. Iwate, Japan: Observations and Energy Balance Analyses: K. Suzuki, T. Ohta, A. Kojima and T. Hashimoto 2675

Modelling Subsurface Flow Conditions in a Salinized Catchment in South-western Australia, with a View to Improving Management Practices: W. J. Stolte, R. J. George and D. J. McFarlane 2689

Sediment Transport, Redistribution and Storage on Logged Forest Hillslopes in South-eastern Australia: J. Croke, P. Hairsine and P. Fogarty 2705

Temporal Trends of Bulk Precipitation and Stream Water Chemistry (1977–1997) in a Small Forested Area, Krusné hory, Northern Bohemia, Czech Republic: N. E. Peters, J. Cerny, M. Havel and R. Krejci 2721

Estimation of Evaporation from the Dead Sea: B. N. Asmar and P. Ergenzinger . . 2743

Spatially Distributed Hydrotope-Based Modelling of Evapotranspiration and Runoff in Mountainous Basins: J. Gurtz, A. Baltensweiler and H. Lang 2751

Sediment Transport by Overland Flow over an Area of Net Deposition: L. Beuselinck, G. Govers, A. Steegen and T. A. Quine 2769

Differences in Gravity-dominated Unsaturated Flow during Autumn Rains and Snowmelt: H. K. French, S. E. A. T. M. van der Zee and A. Leijnse 2783

Field-scale Phosphorus Losses from a Drained Clay Soil in Sweden: B. Ulén and K. Persson 2801

A Ground Water Recharge Field Study: Site Characterization and Initial Results: W. J. Gburek and G. J. Folmar 2813

The Silica Supersaturated Waters of Northern Evia and Eastern Central Greece: G. Stamatis and E. Gartzos 2833

Numerical Simulation of Transport and Sequential Biodegradation of Chlorinated Aliphatic Hydrocarbons using CHAIN_2D: J. Schaerlaekens, D. Mallants, J. Simunek, M. Th. van Genuchten and J. Feyen 2847

Prediction of Sediment Yield by Coupling Kalman Filter with Instantaneous Unit Sediment Graph: Y. H. Lee and V. P. Singh 2861

High Resolution Climate Change Scenarios: Implications for British Runoff: C. Pilling and J. A. A. Jones 2877

Transmission Losses in Rills on Dryland Hillslopes: A. J. Parsons, J. Wainwright, P. M. Stone and A. D. Abrahams 2897

The Ganges and Brahmaputra Rivers in Bangladesh: Basin Denudation and Sedimentation: M. R. Islam, S. F. Begum, Y. Yamaguchi and K. Ogawa 2907

Characterization of Aquifer System in Upper Palar Basin: A Case Study: M. Thangarajan and V. S. Singh 2925

Application of a Conceptual Method for Separating Runoff Components in Daily Hydrographs in Kimakia Forest Catchments, Kenya: J. M. Mugo and T. C. Sharma . 2931

VOLUME 13, ISSUE No. 18 *December 1999*

Preface 2941

Announcement and Call for Papers 2943

The Specific Surface Area of Fresh Dendritic Snow Crystals: S. R. Fassnacht, J. Innes, N. Kouwen and E. D. Soulis 2945

Turbulent Fluxes during Blowing Snow: Field Tests of Model Sublimation Predictions: J. W. Pomeroy and R. L. M. Essery 2963

CO_2 in Arctic Snow Cover: Landscape Form, In-Pack Gas Concentration Gradients, and the Implications for the Estimation of Gaseous Fluxes: H. G. Jones, J. W. Pomeroy, T. D. Davies, M. Tranter and P. Marsh 2977

Radar Investigations of Melt Pathways in a Natural Snowpack: M. Albert, G. Koh and F. Perron 2991

Solute Flux in Meltwaters Draining from a Glacierized Basin in the Karakoram Mountains: D. N. Collins 3001

Algorithm Application to Improve Weather Radar Snowfall Estimates for Winter Hydrologic Modelling: S. R. Fassnacht, E. D. Soulis and N. Kouwen 3017

Determination of Snow Water Equivalent using RADARSAT SAR Data in Eastern Canada: M. Bernier, J. P. Fortin, Y. Gauthier, R. Gauthier, R. Roy and P. Vincent . 3041

Author Index 3053

Keyword Index 3057

Volume Contents iii